

Japan Patent (JP)

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Title of Invention : Chlorinated Polymer Composition  
Inventors : Tsujimoto, Hideo and Wachi, Toshio  
Applicant : Sakai Chemical Industry Co., Ltd.  
5-1 Ebisujima-cho, Sakai-city, Osaka, Japan

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#### Claims

1. Title of the invention  
Chlorinated Polymer Composition

#### 2. Claims

Chlorinated polymer composition which contains at least one or more than two kinds of the chemical compounds consisting of pentaerythritol tetra (thioglycolate), pentaerythritol tetra (3-mercaptopropionate), and dipentaerythritol hexa (3-mercaptopropionate).

#### 3. Description

##### (1) Field of the invention

The present invention relates to a chlorinated polymer composition. In particular, this invention relates to a chlorinated polymer composition which improves the thermal stability and the transparency of the composition without containing a metal, and it is desirable to be used for the chlorinated polymer composition which is related to the electronic material.

##### (2) Background of the invention (Prior Art)

Chlorinated polymer compositions often cause pyrolysis mainly due to the de-hydrogen-chloride during thermoforming process. Therefore, chlorinated polymer compositions have some disadvantages such as the deterioration of the mechanical properties and the color tone of the processed product. In order to avoid those disadvantages, it is necessary to add a kind or some kinds of thermal stabilizers to prevent the deterioration in the processing.

So far, various compounds have been used as the stabilizers. However, metal-free compounds usually have insufficient effect as the stabilizers. As a matter of fact, it is not suitable with a metal compound in some cases such as, for example, the packing container of the electronic materials, the cases, the equipments, because water and acid cleaning is necessary before use of those products and a metal might elute in such cases.

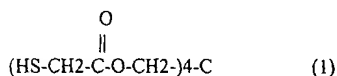
Therefore, alkylphenol compounds, organic phosphorus compounds, and epoxy compounds, etc. have been used as metal-free stabilizers, but the stabilizing effect (mainly the effect of the thermal stability) was insufficient.

##### (3) Purpose of the invention.

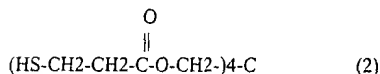
The inventors have carried out several examinations in view of the present situation. The present invention seeks to provide the chlorinated polymer composition having excellent thermal stability and transparency as a metal-free stabilizer

##### (4) Constitution of the invention

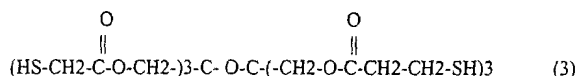
The present invention is a chlorinated polymer composition which contains at least one or more than two kinds of the chemical compounds as described bellow.



A pentaerythritol tetra (thioglycolate) is abbreviated to PTTG from here.



A pentaerythritol tetra (3-mercaptopropionate) is abbreviated to PTMP from here.



A dipentaerythritol hexa (3-mercaptopropionate) is abbreviated to DHMP from here.

100 pts. wt chlorinated polymer is blended with 0.01-10 pts. wt. of the above compound, and it is desirable with 0.1-5 pts wt. compound. Optionally, it is allowed to add other meta-free stabilizer, an antioxidant, an ultraviolet absorber, etc. if necessary. Here a chlorinated polymer is given such as a vinyl chloride polymer, a chlorinated vinyl chloride polymer, an ethylenated vinyl chloride polymer, or a copolymer thereof with other polymers.

The present invention will be explained in more detail by the following examples.

#### Examples 1 - 8.

The compositions shown in Table-1 were blended for 5 minutes by using a 8-inch roll at 170 degree Celsius, and sample sheets were obtained with the thickness of 0.3mm. In order to evaluate the thermal stability, those sample sheets were put in the gear oven at 180 degree Celsius, and measured the time to become discolored in auburn. In addition, the other sample sheets with the thickness of 2mm were obtained at 170 degree Celsius for 5 minutes by using the press with the pressure of 50kg/cm<sup>2</sup>. The primary color and the transparency of those samples were evaluated.

#### Comparative examples 1 - 5.

As shown in Table-1, the examples of the present invention were compared with the compounds contained an organic compound or a metal without PTTG, PTMP, and DHMP in the same way as stated above.

Table -1.

	Examples								Comparative examples				
	1	2	3	4	5	6	7	8	1	2	3	4	5
Vinyl chloride polymer	100	100	100	100	100	100			100	100	100	100	100
Vinyl chloride- vinyl acetate- copolymer							100	100					
Epoxy- soy bean oil	2	2	2	2	2				2	2	2	2	2
Epoxy resin						1							
Stearic acid	1	1	1	1	1	1	1	1	1	1	1	1	1
PTTG	3			2			0.5						
PTMP		2.5			2		1.5	1.5					
DHMP			2			2		0.5					
Trishydroxyethyl isocyanate				0.5	0.5	0.5		0.2				2	
1,4-Butanediol bis -minocrotonate									2		2		
pentaerythritol										2	1		
Calcium-zinc stabilizer													2
Time to discolor in argon at 180C	70	65	60	60	60	60	60	70	30	20	40	30	40
Primary color	CL	CL	CL	CL	CL	CL	CL	CL	LY	LB	SY	LD	SY
Transparency	T	T	T	T	T	T	T	T	T	MW	W	T	T

&lt;SYMBOLS&gt;

CL : colorless

LY : light yellow.

LB : light brown.

SY : slight yellow.

LD : light dark brown.

T : transparency.

MW : milk white

W : white